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A KEY AND SELECTED NOTES FOR THE IDENTIFICATION OF LARVAE OF SEPSIDAE (DIPTERA) FROM THE TEMPERATE REGIONS OF NORTH AMERICA

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Abstract.—Distribution notes, habitat notes and a key to species are provided for the nine species of Sepsidae making up 99% of the specimens collected in Virginia, Ohio and Indiana. Most of these species are Holarctic. All known larvae of Sepsidae are scavengers and feed on carrion, sewage, feces, and perhaps rotting vegetation.

The family Sepsidae is represented in North America by 26 species in nine genera. Most of the common species are Holarctic and were described from European material. Most of the descriptive work concerning the immatures of European species was done by Hennig (1949) and Schumann (1962). Papers by Mohr (1943) working in Illinois and Laurence (1954) in England include most of the previous work concerning the ecology of the immature Sepsidae. This study was made from specimens from rearings in Virginia, Ohio, and Indiana during the summer months of 1968, 1969, and 1971. The species included in this key represent more than 99% of all specimens of Sepsidae collected during these months.

Known Distribution of Species in Key

Meroplius stercorarius (Robineau-Desvoidy) 1830. Europe, British Columbia, Quebec, Virginia west to Utah.

Nemopoda nitidula (Fallén) 1820. Europe, Alberta, Quebec south to Virginia, Ohio, Indiana.

Saltella sphondylii (Schrank) 1803. Europe, Virginia to California, Quebec.

Sepsis biflexuosa Strobl 1893. Europe, British Columbia to Quebec, Virginia to New Mexico, Illinois.

Sepsis neocynipsea Melander and Spuler 1917. All U.S.A., Alaska to Quebec, Mexico south to Mexico City.

Sepsis punctum (Fabricius) 1794. Europe, all eastern U.S.A., California, Texas.

Themira putris (L.) 1758. Scandinavia, Europe, British Columbia to Quebec, Virginia to California.

Enicita annulipes (Meigen) 1826. Europe, Quebec to Virginia, Ohio west to Montana.

Enicomira minor (Haliday) 1833. Europe, Virginia west to Idaho, Michigan, New York.

The following community types have been intensively sampled and indicate likely larval habitats.

Feces in open pastures: *Sepsis punctum*, *S. neocynipsea*, *S. biflexuousa*, *Saltella sphondylii*.

Cattle feeding pens (wet soil, masses of feces): *Sepsis punctum*, *S. biflexuousa*, *Meroplius stercorarius*, *Themira putris*, *Enicita annulipes*, *Enicomira minor*.

Small mammal feces: *Sepsis punctum*, *S. neocynipsea*, *Nemopoda nitidula*.

Sewage leaks and overflows: *Enicita annulipes*, *Sepsis biflexuousa*.

Small mammal and fish carrion: *Meroplius stercorarius*, *Nemopoda nitidula*, *Sepsis punctum*, *S. neocynipsea*.

Rotting vegetation in mesic woodlands: *Themira putris*, *Sepsis punctum*, *Meroplius stercorarius*, *Nemopoda nitidula*.

Family Characteristics, Third-Instar Immatures

Segment 1 with dorsal sensory papillae and ventral sensory plate present. Facial mask with rami surrounding atrium, various degrees of facial sculpturing. Cephalopharyngeal skeleton: Complete, dorsal bridge with windows, mouth hooks paired, pharyngeal floor extending beneath hypostomal sclerite. Anterior spiracles with pinnately arranged papillae, 1 or 2 terminal papillae present. Ventral surface with creeping welts and 2 rows of sclerotized spinules. Terminal segment with dorsal projections on posterior spiracular process and ventral projections on (or anterior to) posterior spiracular process.

Key to Third Instars of Sepsidae

1. Anterior spiracles extending laterally from body, greater than 10 papillae per spiracle (Fig. 1, 2) 2
– Anterior spiracles apressed to body, directed anteriorly, fewer than 9 papillae per spiracle (Fig. 3) 6
2. Posterior spiracles directed posteriorly from sagittal midline, parastomal bar (p.b.) extending less than ¼ length of hypostomal sclerite (h.s.) (Fig. 4) *Enicita annulipes* (Meigen)
– Posterior spiracles directed dorsoposteriorly from dorsoposterior surface, parastomal bar at least extending ⅓ the length of hypostomal sclerite 3
3. Posterior spiracles arising independently from posterior surface of terminal segment, segment truncate, not tapering (Fig. 5) *Enicomira minor* (Haliday)
– Posterior spiracles may be fused at base, posterior segment tapering posteriorly from anal pad to dorsoposterior spiracular processes 4

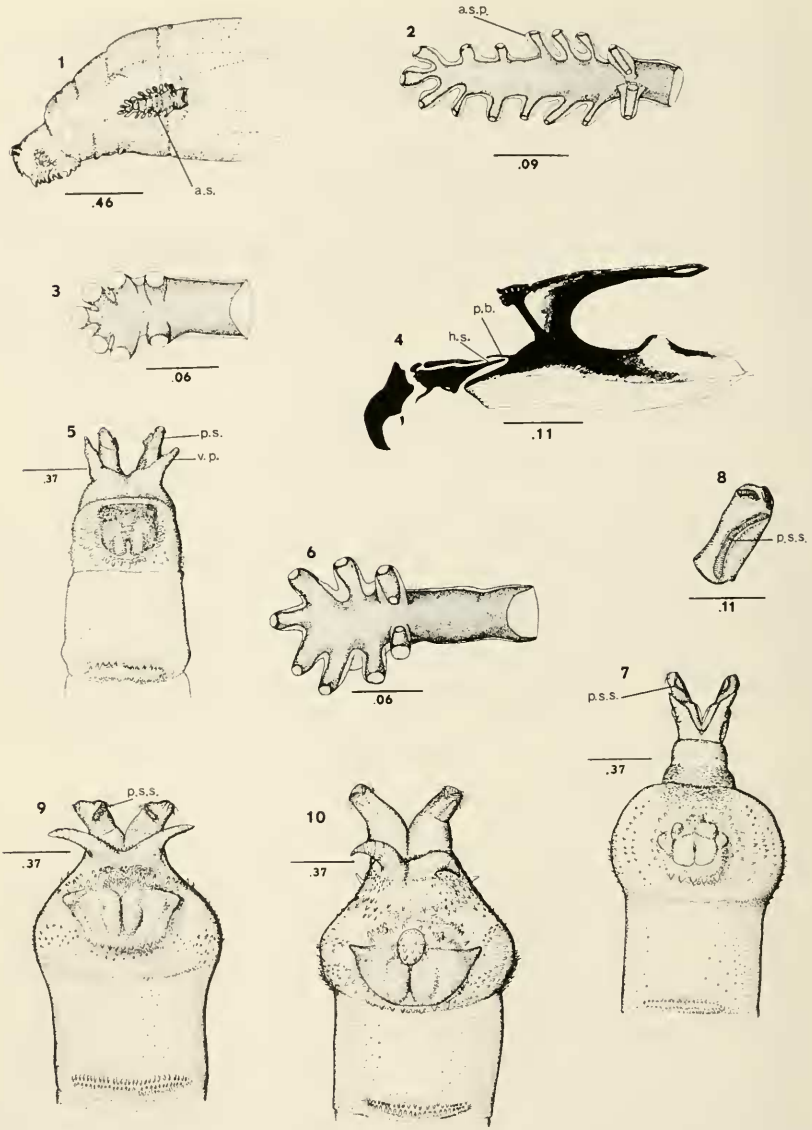

Fig. 1. Anterior segments, *T. putris*. Fig. 2. Anterior spiracle, *T. putris*. Fig. 3. Anterior spiracle, *S. punctum*. Fig. 4. Cephalopharyngeal skeleton, *E. annulipes*. Fig. 5. Posterior segments, ventral view, *M. stercorarius*. Fig. 6. Anterior spiracle, *M. stercorarius*. Fig. 7. Posterior segments, ventral view, *S. biflexuosa*. Fig. 8. Posterior spiracle, median view, *S. biflexuosa*. Fig. 9. Posterior segments, ventral view, *S. neocynipsea*. Fig. 10. Posterior segments, ventral view, *S. punctum*.

Abbreviations are: a.s., anterior spiracle; a.s.p., anterior spiracle papilla; h.s., hypostomal sclerite; p.b., parastomal bar; p.s., posterior spiracle; p.s.s., posterior spiracular slit; and v.p., ventral process.

4. Basal papillae of anterior spiracle at least 2× as long as terminal papillae, terminal segment with tapering part drawn out to length longer than bulbous part of segment, ventral process on posterior spiracle forked *Saltella sphondylii* (Schrank)
- Anterior spiracle papillae of nearly equal size, terminal segment tapering but not elongated (Fig. 2), ventral process not forked 5
5. Anterior spiracle greatly elongated, usually more than 15 papillae, spiracle length at least 9× as long as longest papilla *Themira putris* (L.)
- Anterior spiracle shortened, not more than 14 papillae, spiracle length at most 5× as long as longest papillae *Nemopoda nitidula* (Fallén)
6. Terminal abdominal segment nearly identical in lateral width to 11th segment, lateral surface of 1st segment bare, anterior spiracles with 8 papillae (Fig. 5, 6) *Meroplius stercorarius* (Robineau-Desvoidy)
- Terminal abdominal segment often larger in lateral width than 11th segment, lateral surface of 1st segment with rami connecting to ventral surface, anterior spiracles with 6 or 7 papillae 7
7. Posterior spiracles joined at base of sclerotized part (Fig. 7), ventral processes attached at base of sclerotized part, spiracular slit (Fig. 8) extending the length of the sclerotized part of spiracle, tapering part of terminal segment longer than bulbous part *Sepsis biflexuosa* Strobl
- Posterior spiracles not joined at base of sclerotized part, ventral process arising from base of fleshly part of spiracular process, spiracular slits either terminal or encircling sclerotized part of spiracle, tapering part of terminal segment shorter than bulbous part 8
8. Posterior spiracle with 1 slit on medioventral surface of sclerotized part (Fig. 9) *Sepsis neocynipsea* Melander and Spuler
- Posterior spiracle with all slits on terminal surface (Fig. 10) *Sepsis punctum* (Fabricius)

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Literature Cited

Brindle, A. 1965. Taxonomic Notes on the larvae of British Diptera, No. 20. The Entomologist 98(1225):137–140.

Hennig, W. 1949. Die Fliegen der paläarktishen Region, 39a Sepsidae, 1–91.

Laurence, B. R. 1954. The larval inhabitants of cow pats. J. Animal Ecol. 23: 234–260.

Mohr, C. O. 1943. Cattle droppings as ecological units. Ecological Monographs 13:275–298.

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